In The Claims:

1   1. A method for transmitting

2 communications signals to a plurality of mobile

3 terminals, comprising:

4   processing a received signal at a ground

5 hub;

6   radiating said signal through multiple

7 paths to at least two satellites;

8   re-radiating said signal from said at least

9 two satellites to an intended mobile terminal;

10   perturbing the inclination and eccentricity

11 of said at least two satellites relative to the same

12 geosynchronous reference orbit;

13   whereby the periods of geosynchronous

14 orbits of said at least two satellites remain

15 substantially constant.

1   2. The method of claim 1, further

2 comprising:

3   radiating a signal from said intended

4 mobile terminal to said at least two perturbed

5 satellites;

6   re-radiating said signal from said at least

7 two perturbed satellites to said ground hub.

1   3. The method of claim 2, further

2 comprising:

3   determining a relationship between said

4 inclination and said eccentricity of said satellites

5 such that they appear to move at a constant speed
6 along circular paths whose centers are located at the
7 position of a hypothetical reference satellite in an
8 unperturbed geosynchronous orbit.

1   4. The method of claim 3, further
2 comprising:
3   maintaining the geometry of said cluster of
4 at least two satellites such that the distances
5 between any two of said satellites is relatively
6 constant.

1   5. The method of claim 4, further
2 comprising:
3   adding additional satellites to said at
4 least two satellites to augment the satellite
5 constellation.

1   6. The method of claim 4, wherein the
2 conditions for circular apparent motion of the
3 perturbed satellite relative to said satellite
4 constellation center is approximated by the
5 following:

6
$$\sin i = 2\varepsilon$$
$$t_o = \pm \tfrac{1}{4} T_{GEO}$$

1   7. A mobile wireless communication
2 system, comprising:
3   a satellite constellation consisting of a
4 plurality of satellites each in a slightly perturbed
5 geosynchronous orbit;

6   each of said plurality of satellites being
7   capable of relaying signals between the ground hub
8   and the plurality of user terminals in either
9   direction;
10   whereby as said satellite constellation
11   appears to rotate the apparent inter-satellite
12   spatial relationships are maintained.

1   8. The mobile wireless communication
2   system of claim 7, wherein each of said plurality of
3   satellites has its inclination and eccentricity
4   perturbed relative to a common geosynchronous
5   reference orbit.
1

1   9. The mobile wireless communication
2   system of claim 8, wherein the orbit of each of said
3   plurality of satellites is perturbed such that it
4   appears to move at a constant speed along a circular
5   path as viewed by a single user.

1   10. The mobile wireless communication
2   system of claim 7, wherein the respective distances
3   among the said plurality of satellites is
4   substantially constant.

1   11. The mobile wireless communication
2   system of claim 9, wherein the conditions for
3   circular apparent motion of the perturbed satellite
4   relative to said satellite constellation center is
5   approximated by the following:

$$\sin i = 2\varepsilon$$

6

$$t_a = \pm \frac{1}{4} T_{GEO}$$

1   12. The mobile wireless communication

2 system of claim 7, wherein in order for coherent

3 reception of signals by their intended user, said

4 intended user's location must be determined to within

5 a specified tolerance ε_x, which is determined

6 according to the following equation:

7

$$\varepsilon_x << \frac{\varepsilon_{tol} \lambda_{min} r_{min}}{\Delta D_{x\,max}}$$

1   13. The mobile wireless communication

2 system of claim 7, wherein in order for incoherent

3 reception of signals from interfering (non-intended)

4 users, said interfering users must be displaced at

5 least a distance

6

$$\Delta x_{min} \geq \frac{c r_{max}}{2 W_N \delta \Delta D_{x\,min}}$$

7 from the user receiving the signal

1   14. The mobile wireless communication

2 system of claim 11, wherein the apparent motions of

3 said plurality of satellites in said satellite

4 constellation can be arranged to appear circular as

5 perceived from any one point in the coverage area.

1   15. A method for establishing a link

2 between a ground hub and a plurality of mobile

3 terminals, comprising:

4   preprocessing a received signal at said
5 ground hub;

6   transmitting said signal through a
7 plurality of satellites in a satellite constellation
8 to an intended one of the mobile terminals;

9   perturbing the inclination and eccentricity
10 of said plurality of satellites relative to a common
11 geosynchronous reference orbit; and

12   determining a relationship between said
13 inclination and said eccentricity of said plurality
14 of satellites such that they appear to move at a
15 constant speed along circular paths where centers are
16 located at a position defined by a hypothetical
17 reference satellite in an unperturbed geosynchronous
18 orbit.

1   16. The method of claim 15, further
2 comprising:

3   maintaining the periods of geosynchronous
4 orbit of said plurality of satellites substantially
5 constant.

1   17. The method of claim 15, further
2 comprising:

3   maintaining the apparent inter-satellite
4 spatial relationships between said plurality of
5 satellites as they appear to rotate.

1   18. The method of claim 15, wherein said
2 relationship is approximated by the following:

$$\sin i = 2\varepsilon$$
$$t_o = \pm\frac{1}{4}T_{GEO}$$

3

1   19. The method of claim 15 wherein in
2 order for incoherent reception of signals from
3 interfering (non-intended) users, said interfering
4 users must be displaced at least a distance

$$\Delta X_{MIN} \geq \frac{Cr_{MAX}}{2W_N \,\delta\Delta D_{xMIN}}$$

5

6 from the user receiving the signal.

1   20. The method of claim 15, wherein in
2 order for coherent reception of signals by their
3 intended user, said intended user's location must be
4 determined to within a specified tolerance ε_x, which
5 is determined according to the following equation:

$$\varepsilon_x \propto \frac{\varepsilon_{tol}\,\tau_{min}\,r_{min}}{\Delta_{x\,min}}$$

6

1